

## **A Modified Sealed Gravitational Capillary Viscometer for Volatile Liquids**

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If the normal boiling point temperatures of fluids (volatile fluids) are below ambient temperature, the fluids will evaporate at atmospheric pressure. Hence, capillary viscometers must be sealed to prevent the evaporation of the fluids during the measurements. Up to now, some similar Ubbelohde capillary viscometers were developed, such as that by Ripple 1992, Ripple and Defibaugh, 1997, Han 1995, but there are some bugs with the present viscometers. Such as, it is difficult to measure the viscosities of mixtures with the viscometer designed by Han and one has to correct the  $h$  of the capillary length. The viscometer designed by Ripple has to measure the position  $h$  of the liquid-vapor interface in the upper reservoir and is observed with a cathetometer. In this work, an improved viscometer based on Ripple 1997 was designed and constructed. The position  $h$  isn't necessary for the new viscometer. The new viscometer is easier to use than before. Also, the modified viscometer consists of two stainless steel reservoirs with sapphire windows, and the reservoirs are connected in one viscometer by a straight vertical stainless steel capillary of length  $l = 150$  mm and inner diameter  $d = 0.36$  mm. This viscometer is calibrated with toluene and benzene. The estimated uncertainty of the viscosity measurements is  $\pm 3\%$ .

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